

# The distribution of path-dependent options with applications to profit sharing

Zhaoning SHANG

Katholieke Universiteit Leuven, Belgium

Koen VAN WEERT

Katholieke Universiteit Leuven, Belgium

Jan DHAENE

Katholieke Universiteit Leuven, Belgium  
Universiteit van Amsterdam, The Netherlands

Marc GOOVAERTS

Katholieke Universiteit Leuven, Belgium  
Universiteit van Amsterdam, The Netherlands

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## Abstract

Different profit sharing schemes are employed by the insurance companies to compensate the policyholders in case of excess return. In this paper, we derived an upper bound approximation for the distribution of the path and time dependent option based on the theory of convex ordering and the relation between the expectation of the stop-loss premium and its distribution function. We then apply this approximation to the problem of profit sharing, or so called participation gain, and approximate the value of the minimum return guarantee.

**Keywords:** profit sharing, diffusion process, comonotonicity